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BOOK REVIEW

Katarina Juselius, *The Cointegrated VAR Approach: Methodology and Applications*, Advanced Texts in Econometrics, Oxford University Press, Oxford, 2006, 457 p., $ 55 (ISBN 0-19-928566-7, 978-0-19-928566-2, 0-19-928567-5 (Pbk.), 978-0-19-928567-9 (Pbk.))

Anthony Garratt, Kevin Lee, M. Hashem Pesaran, and Yongcheol Shin, *Global and National Macroeconometric Modelling: A Long-Run Structural Approach*, Oxford University Press, Oxford, 2006, 370 p., $ 125 (ISBN 978-0-19-929685-9)

Since Sims argued in 1980 that the structural identification of the then-existing simultaneous equations macroeconometric models (SEM) was incredible, his alternative, Vector Autoregressive (VAR) models, *i.e.* unrestricted reduced forms treating all variables as endogenous, has become quite popular. It was soon understood that, for policy analysis, VAR models still require identifying restrictions, which resulted in a variety of 'structural VAR' models. The cointegration literature, which transformed the VAR into the vector error correction model (VECM), provided one way to impose structure, by placing identifying restrictions drawn from economic theory on the long-run cointegrating relationships, leaving the short-run dynamic and stochastic specification unrestricted. This approach is called 'cointegrated VAR modelling' (Juselius) or 'long-run structural modelling' (Garratt, Lee, Pesaran and Shin; henceforth GLPS) in two recent books on this modern macroeconometric modelling methodology.

The advanced textbook of Juselius has a strong orientation towards testing. After introductory chapters on econometric methodology, *i.e.* how to combine economics and econometrics to build econometric models, she specifies the VAR model and the cointegrated VAR model, and explains in great detail how these models can be estimated and hypotheses on cointegration can be tested. In the fourth part she discusses several varieties of identification in the cointegrated VAR model. The fifth part is a lucid exposition of the I(2) model, which is especially relevant when prices enter the model. In the first five parts the concepts are illustrated focusing on inflation using Danish money market data over the period 1973q1–2003q1. In the final part the model is extended adopting a general-to-specific approach with labour market data and German inflation and interest rates.

GLPS document the efforts of the authors in the construction of a long-run structural model of the UK, supplemented with the description of

a global VAR model. Their model of the UK incorporates long-run structural relationships suggested by economic theory as the cointegrating relations of a VECM. The UK economy is a small open economy, subject to economic developments in the rest of the world, hence in the VAR approach both domestic and foreign variables are treated as variables of interest to be modelled. The underlying economic theory delivers long-run relations or equilibrium conditions among these variables, based on production, arbitrage, solvency and portfolio balance conditions, together with stock-flow and accounting identities. The model is estimated using quarterly data over the period 1965q1–1999q4, and evidence is found for the cointegration relationships predicted by economic theory. Thereafter the model is analysed with newly developed tools: (i) generalized impulse responses, which describe the effects of 'realistic' shocks, meaning shocks that are typically or at least historically observed; (ii) persistence profiles, which consider the effect of system-wide shocks on the evolution of the system; and (iii) probability forecasts, or a statement of the likelihood of a specified event taking place conditional on the available information.

The global VAR model considers country or regional submodels, estimated using quarterly data over the period 1979q1–1999q1. Each individual country/regional model includes domestic and foreign variables. The country/regional-specific foreign variables, which are weakly exogenous in the estimation of the submodels, are obtained by aggregating data on the foreign economies, using their shares in the home country's trade as weights. All countries are other countries' trading partners, and in solving the model a globally consistent solution for the country-specific variables is obtained. The dynamic properties are then studied by generalized impulse responses.

Obviously, a review like this cannot do full justice to the novel macroeconometric modelling methodology. To fully appreciate the new method, one has to implement it and perform a proper comparison with other types of models. To date structural long-run models are scarce. In the Netherlands for example cointegrated VAR models have not been constructed, although cointegration relationships do feature in the SEMs of De Nederlandsche Bank and CPB Netherlands Bureau for Economic Policy Analysis. The curse of dimensionality, *i.e.* data limitations constrain the number of variables that can be considered, may hamper their use at central banks and government agencies, but this drawback might be easily overcome by developing satellite models as discussed in GLPS Section 3.3.2. So, nothing prevents us from applying the methodology. The two books under review offer an excellent starting point!

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